FINAL REPORT

Symposium on Optimizing Methods in Statistics

By

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The Ohio State University

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13. ABSTRACT

The symposium on optimizing methods in statistics was held at The Ohio State University on June 14-16, 1971. Research workers from universities, industry and government participated. Twenty five papers were presented. The complete proceedings of the symposium are being published by the Academic Press, New York.

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Symposium on Optimizing Methods
in Statistics

Introduction

Problems of optimization in statistics arise in many different contexts. The methods of estimation require maximization or minimization of certain functions. The classical methods of least squares, maximum likelihood, minimum variance and minimum chi square are associated by their very name with optimization. The statistical decision theory deals with problems of finding optimum decision rules. In the theory of tests of hypotheses, methods of obtaining most powerful tests are directly associated with the process of optimization. Techniques of mathematical programming also have been used in statistics in many contexts, such as in estimation of parameters of a Markov chain and in regression analysis. Statisticians have also contributed in the development of many optimizing methods such as the variational techniques provided by Neyman and Pearson. In solving practical problems, Statisticians have contributed significantly to the development of many numerical methods of optimization.

In order to bring active research workers together to exchange ideas and to stimulate young researchers in this important area, a symposium on optimizing methods in statistics was held at The Ohio State University during June 14-16, 1971. The program of the sessions included the following topics:

1. Variational Methods
2. Regression Analysis
3. Optimum Seeking Methods
4. Mathematical Programming
5. Stochastic Control

6. Optimum Design of Experiments
7. Optimum spacing and Order Statistics
8. Problems and Applications
9. Contributed Papers

The organising committee had the following members:

Professor Herman Chernoff, Stanford University,
Professor Bernad Harris, University of Wisconsin,
Lt. Col. W. R. Trott, U. S. Air Force Office of Scintific Research,
Professor J. S. Rustagi, Chairman.

The chairmen of the various sessions were the following.

Lt. Col. W. R. Trott, AFOSR
Professor S. S. Gupta, Purdue University
Professor Bernard Harris, University of Wisconsin
Dr. P. R. Krishnaiah, Wright-Patterson Air Force Base
Professor R. L. Anderson, University of Kentucky
Professor Ingram Olkin, Stanford University
Professor B. Mond, La Trobe University
Professor J. Gastwirth, Harvard University
Professor D. R. Whitney, The Ohio State University
Professor W. A. Thompson Jr., University of Missouri
Dr. L. Wolaver, Air Force Institute of Technology
Professor W. J. Hall, University of Rochester
Professor G. Kulldorff, University of Umea and Purdue U.

The banquet speaker was Professor J. Wolfowitz, University of Illinois. All the sessions were held at The Center of Tommorow of The Ohio State University. About one hundred and twenty five persons attended the symposium.

Contributions

The following papers were presented at the symposium.

The efficient estimation of a parameter measurable by two instruments of unknown precision
Herman Chernoff

Optimization problems in imulation
Herman Rubin

Some optimization problems in parameter estimation
H. Leon Harter

Optimal designs and spline regressions
W. J. Studden

Isotonic approximation
R. E. Barlow and V. Ubhaya

Assymptotically efficient estimation of nonparametric regression coefficients
L. Weiss and J. Wolfowitz

Comparisons of order statistics and spacings from hetero-geneous distributions
Gordon Pledger and Frank Proschan

Moment problems with convexity conditions
J. H. B. Kemperman

Variational methods in adaptive filtering
Andrew P. Sage

Nonlinear filtering
G. Kallianpur

A convergence theorem for non negative almost super-
martingales and some applications
H. Robbins and D. Siegmund

On relationships between the Neyman-Pearson problem and
linear programming
Richard L. Francis

Statistical control of optimization
H. O. Hartley and R. Pfaffenberger

Current capabilities in mathematical programming
Philip Wolfe

Patterns and search statistics
Allen Klinger

Necessary conditions for a local optimum without prior
constraint qualification
G. V. Reklaitis and D. J. Wilde

Mathematical models for statistical decision theory
Bernard Harris

Chance constrained programming: an extension of statistical
method
A. Charnes, W. W. Cooper and M. J. L. Kirby

Stochastic allocation of spare components
Bennet P. Lientz

Outlier proneness of phenomena and of related distributions
Jerzy Neyman and Elizabeth L. Scott

Problem areas requiring optimizing methods
John V. Armitage

Stochastic approximation
Václav Fabian

Contributed Papers:

Allocation of observations in ranking and selection with unequal variances
Edward J. Dudewicz and Siddhartha R. Dalal

Sequences of minimal fractions of 2^n designs of resolution V
Peter W. M. John

Optimal interval estimation for the largest scale parameter
K. M. Lal Saxena and Yung Liang Tong

c-Sample tests of homogeneity against ordered alternatives
Z. Govindarajulu and H. Smith Haller, Jr.

Publications

The proceeding of the symposium, containing papers invited by the organising committee, are being published by Academic Press, New York. It is expected that they will be ready by the end of 1971. The required copies will be submitted to the Air Force Office of Scientific Research when available from the Publishers.

Contributors

The list of contributors with their addresses is attached.

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